- Medium Density Matrix With 224 Crosspoints
- 42x4, 32x6, 25x8, 18x12 and 14x16 Options
- Maximum Current 2A Hot or Cold Switching
- Switch up to 300VDC/250VAC and up to 60W Max Power
- Uses Gold-Plated Contact Electro-mechanical Relays
- VISA/IVI Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by eBIRST ™
- 3 Year Warranty

The 40-505/506/507/508/509 are a range of medium density matrix modules able to switch up to 2 Amps or 300VDC/250VAC. They are constructed using high quality electro-mechanical relays for high switching confidence.

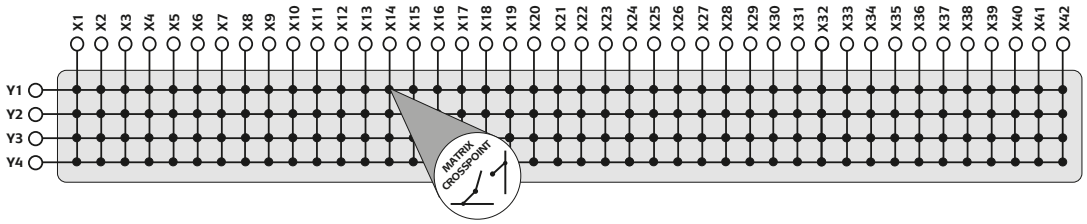
The matrix configuration is dependent on the model as follows:

- 40-505 42x4, 1-Pole Matrixt
- 40-506 32x6, 1-Pole Matrix
- 40-507 25x8, 1-Pole Matrix
- 40-508 18x12, 1-Pole Matrix
- 40-509 14x16, 1-Pole Matrix

The modules are designed for switching medium voltage and power signals. Connections are made via a robust 160-pin DIN 41612, 78-pin D-type or 50-pin D-Type connector that is fully supported by our wide range of cable and connector accessories.

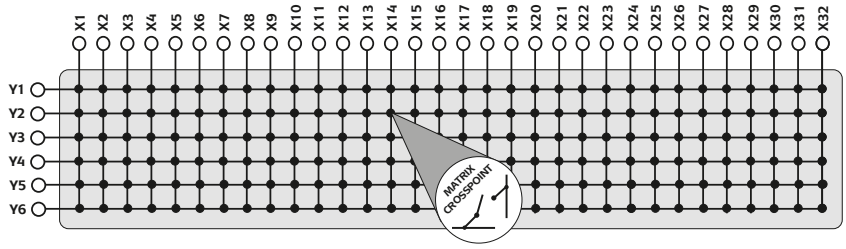
Supported by *eBIRST*

eBIRST switching system test tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.



40-505-001 42x4 Matrix Switching Diagram

The 40-505 supports 4 concurrent switch paths for X to X and Y to X connections, however connections between different Y axis lines (e.g. Y1 to Y2, Y3 or Y4) are not permitted by the driver.



40-506-001 32x6 Matrix Switching Diagram

The 40-506 supports 6 concurrent switch paths for X to X and Y to X connections, however connections between different Y axis lines (e.g. Y1 to any of Y2 to Y6) are not permitted by the driver.

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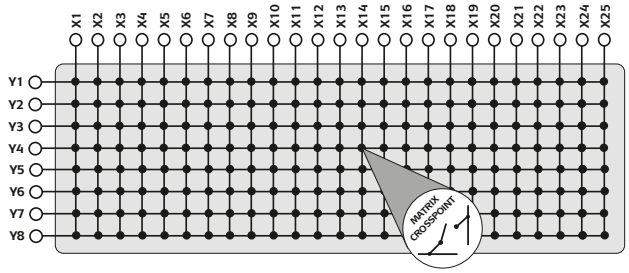
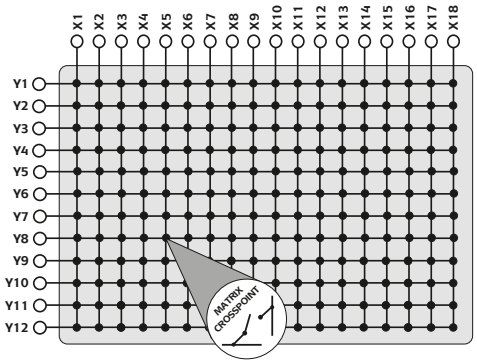


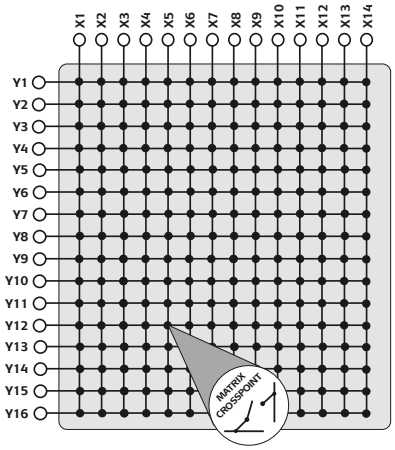
40-507-001 25x8 Matrix Switching Diagram

The 40-507 supports 8 concurrent switch paths for X to X and Y to X connections, however connections between different Y axis lines (e.g. Y1 to any of Y2 to Y8) are not permitted by the driver.



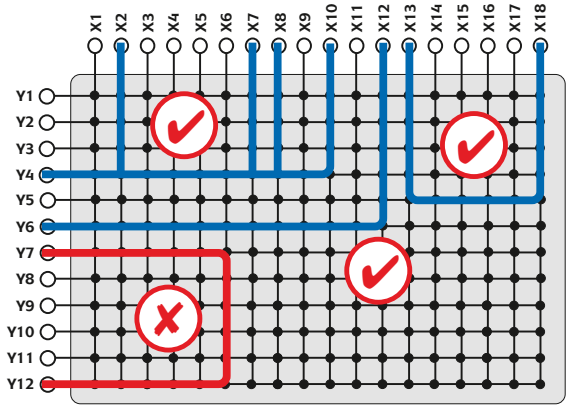
40-508-001 18x12 Matrix Switching Diagram

The 40-508 supports 12 concurrent switch paths for X to X and Y to X connections, however connections between different Y axis lines (e.g. Y1 to any of Y2 to Y12) are not permitted by the driver.



40-509-001 14x16 Matrix Switching Diagram

The 40-509 supports 7 concurrent switch paths for X to X or 14 concurrent Y to X connections, however connections between different Y axis lines (e.g. Y1 to any of Y2 to Y16) are not permitted by the driver.



Allowable Signal Paths For The 40-508 Matrix

Matrix Functionality

The 40-509 permits 7 concurrent X to X paths or 14 concurrent Y to X paths, the 40-505, 40-506, 40-507 and 40-508 permit 4, 6, 8 and 12 concurrent X to X or X to Y paths respectively. As shown in the figure below, X to Y connections (e.g. X15 to Y7) and X to X connections (e.g. X18 to X27) are permitted, also any number of X connections can be connected to to the Y axis (e.g. X2, X8, X9 & X12 to Y5). However, the driver prevents the connection of Y axis connections together (e.g. Y10 to Y15).

Switching Specification

Switch Type:	Electro-mechanical
Contact Type:	Palladium-Ruthenium, Gold Covered, Bifurcated
Max Switch Voltage:	300VDC/250VAC*
Max Power:	62.5VA, 60W
Max Switch Current:	2A
Max Continuous Carry Current:	2A
Max Pulsed Carry Current Example (for a single switch path):	6A for 100ms (up to 10% duty cycle)
Max Continuous Total Switch Path Loading: †	16W (Example allowed conditions – 11 channels at 2A, please contact sales office for further advice)
Initial On Path Resistance:	<0.35Ω
Off Path Resistance:	$>10^9\Omega$
Thermal Offset:	10µV (X to X connection)
Max Number of Simultaneously Closed Crosspoints:	42 (40-505) 32 (40-506) 25 (40-507) 18 (40-508) 14 (40-509)
Operate Time:	6.5ms
Expected Life (Operations)	
Very low power load:	$>1x10^8$
Low power load:	$>1.5x10^7$ (0.1A 20VDC)
Medium power load:	$>5x10^6$ (1A 30VDC)
Full power load:	$>1x10^5$ (2A 30VDC)

* For full voltage rating, signal sources to be switched must be fully isolated from mains supply and safety earth.

† Significantly higher total switch path loading is possible when using Pickering 40-922/923A PXI & 60-102B/103B LXI chassis', please contact sales office for details.

Power Requirements

	+3.3V	+5V	+12V	-12V
40-505	70mA	400mA	0	0
40-506	70mA	310mA	0	0
40-507	70mA	240mA	0	0
40-508	70mA	240mA	0	0
40-509	70mA	135mA	0	0

RF Specification

Bandwidth (-3dB) typical	40-505	10MHz
	40-506	10MHz
	40-507	15MHz
	40-508	15MHz
	40-509	15MHz

		10kHz	100kHz	1MHz	10MHz
Crosstalk (typical)	40-505	-95dB	-75dB	-55dB	-35dB
	40-506	-75dB	-60dB	-40dB	-20dB
	40-507	-70dB	-55dB	-40dB	-20dB
	40-508	-80dB	-65dB	-45dB	-25dB
	40-509	-80dB	-65dB	-45dB	-25dB
Isolation (typical)	40-505	95dB	80dB	65dB	50dB
	40-506	90dB	75dB	60dB	45dB
	40-507	90dB	75dB	60dB	45dB
	40-508	85dB	70dB	55dB	40dB
	40-509	90dB	75dB	55dB	40dB

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 400g.
3D models for all versions in a variety of popular file formats are available on request.

Connectors

PXI bus via 32-bit P1/J1 backplane connector.
Signals via front panel connectors:

- 40-505-001 160-pin male DIN 41612
- 40-506-001 78-pin male D-type
- 40-507-001 78-pin male D-type
- 40-508-001 50-pin male D-type
- 40-509-001 50-pin male D-type

For pin outs please refer to the operating manual..

Operating/Storage Conditions

Operating Conditions

Operating Temperature:	0°C to +55°C
Humidity:	Up to 90% non-condensing
Altitude:	5000m

Storage and Transport Conditions

Storage Temperature:	-20°C to +75°C
Humidity:	Up to 90% non-condensing
Altitude:	15000m

PXI & CompactPCI Compliance

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented.

Uses a 33MHz 32-bit backplane interface.

Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives: Low-voltage safety EN61010-1:2010, EMC Immunity EN61326-1:2013, Emissions EN55011:2009+A1:2010.

Ordering Information

Product Order Codes

42x4 Matrix Module, 1-pole (2A, 60W)	40-505-001
32x6 Matrix Module, 1-pole (2A, 60W)	40-506-001
25x8 Matrix Module, 1-pole (2A, 60W)	40-507-001
18x12 Matrix Module, 1-pole (2A, 60W)	40-508-001
14x16 Matrix Module, 1-pole (2A, 60W)	40-509-001

Product Customization

Pickering PXI modules are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements.

Customization can include:

- Alternative relay types
- Mixture of relay types
- Alternative number of relays
- Different performance specifications

All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

Support Products

eBIRST Switching System Test Tool

This product is supported by the *eBIRST* test tools which simplify the identification of failed relays, the required *eBIRST* tools are below.

Product	Test Tool	Adaptor
40-505	93-002-001	93-002-410
40-506/507	93-006-001	Not Required
40-508/509	93-005-001	Not Required

Spare Relay Kits

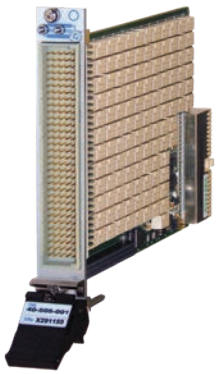
Kits of replacement relays are available for the majority of Pickering's PXI switching products, simplifying servicing and reducing down-time.

Product	Relay Kit
All Types	91-100-001

For further assistance, please contact your local Pickering sales office.

Mating Connectors & Cabling

For connection accessories for the 40-505/506/507/508/509 modules please refer to the 90-001D 160-pin DIN 41612, 90-006D 78-pin D-type and 90-005D 50-pin D-Type Connector Accessories data sheets where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.



40-505-001
42x4 Matrix

40-506-001
32x6 Matrix

40-507-001
25x8 Matrix

40-508-001
18x12 Matrix

40-509-001
14x16 Matrix

Chassis Compatibility

This PXI module must be used in a suitable chassis. It is compatible with the following chassis types:

- All chassis conforming to the 3U PXI and 3U Compact PCI (cPCI) specification
- Legacy and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis
- Pickering Interfaces LXI or LXI/USB Modular Chassis

Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

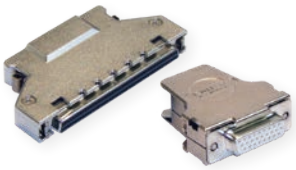
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating system

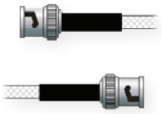
Connectivity Solutions

We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules.

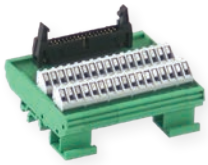


Connectors & Backshells

Multiway Cable Assemblies



RF Cable Assemblies



Connector Blocks

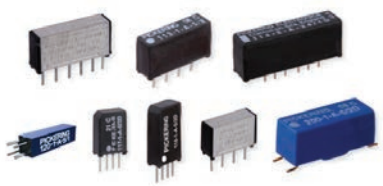
We also offer customized cabling and have a free online Cable Design Tool that can be used to create custom cable solutions for many applications.

Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for a PXI or LXI based test system. Our modules are fully supported by both Virginia Panel and MacPanel.

Pickering Reed Relays

We are the only switch provider with in-house reed relay manufacturing capability via our sister company, Pickering Electronics. These instrument grade reed relays feature ***SoftCenter***® technology, ensuring long service life and repeatable contact performance



Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

The VISA driver is also compatible with Real-Time Operating Systems such as LabVIEW RT. For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Keysight** VEE
- **Mathworks** Matlab
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries.

We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

Signal Routing Software

Our signal routing software, Switch Path Manager, automatically selects and energizes switch paths through Pickering switching systems. Signal routing is performed by simply defining test system endpoints to be connected together, greatly accelerating Test System software development.

Diagnostic Relay Test Tools

eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available for all our modules and systems with various levels to suit your requirements. Although we offer a 3-year warranty as standard, we also include guaranteed long-term support—with a history of supporting our products for typically 15-20 years.

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles, as well as complete product catalogs and product reference maps to assist when looking for the switching, simulation and cable and connector solutions you need. We have also published handy reference books for the PXI and LXI standards.